

Atty. Docket No. CPAC 1013-1
Appl. No. 09/893,356

PATENT

Rejection under 35 U.S.C. § 103(a)

Claims 1-9 were rejected under 35 U.S.C. § 103(a) for obviousness over Applicants' Fig. 2 (Prior Art), or, alternatively, over Huang U.S. 6,400,014 ("Huang").

As to Applicants' Fig. 2, the Examiner asserted:

Applicants' prior art figure 2 discloses a semiconductor device package comprising a semiconductor device affixed to an upper surface of a substrate, a mold cap (204), and a heat spreader (202) affixed to at least a portion of the upper surface of the mold cap.

The Examiner argued that "it would have been obvious that Applicants' prior art discloses the claimed device."

As to Huang, the Examiner asserted:

Huang discloses a semiconductor device package comprising a semiconductor device affixed to an upper surface of a substrate, a mold cap (34), and a heat spreader (33) affixed to at least a portion of the upper surface of the mold cap.

The Examiner argued that it "would have been obvious that Huang discloses the claimed device."

Claim 1 is amended herein to make clearer that the recitation "affixed to at least the upper surface of the mold cap" means that the entire heat spreader is external to the mold cap -- that is, the heat spreader has no sidewall portions embedded in and covered by the mold cap.

In a conventional thermally enhanced PBGA, the heat spreader is partially embedded in the molding cap. *See, e.g.*, sidewalls 210 in Applicants' Fig. 2 and paragraph [0022]; and Huang Figs. 8 - 10.

Similarly, in Huang the heat spreader is partially embedded in the molding cap (encapsulated by the resin body). Huang states, Col. 3, lines 54 - 61, with reference to Huang Fig. 1:

The semiconductor package 3 includes a substrate 30, a chip 31 adhered to the substrate 30, a plurality of gold wires 32 electrically connected to the substrate 30 and the chip 31, and a heat sink 33 disposed on the substrate 30, a resin body 34 for encapsulating the chip 31, the gold wire 32, and a portion of the heat sink 33.

In both the conventional thermally enhanced PBGA of Applicants' Fig. 2 and in Huang heat dissipation by way of the heat spreader is effective only through that portion of the top

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surface of the heat spreader ("heat sink" in Huang) that is exposed to ambient -- that is, the portion of the top surface of the heat spreader that is not covered by mold cap ("resin body" in Huang). See, e.g., Applicants' specification at paragraph [0024], and Huang Col. 1, line 67 - Col. 2, line 4.

Accordingly, it is submitted that neither Applicants' Fig. 2 nor Huang (nor any combination of them) teaches or suggests applicants' invention as claimed, in which the heat spreader is externally affixed to at least a portion of the upper surface of the mold cap -- that is, in which the heat spreader is not embedded in the mold cap.


Accordingly, the rejection for obviousness should be withdrawn.

In view of the foregoing, it is believed that all the claims in the application are in condition for allowance, and action to that effect is requested.

This response is being filed within the shortened statutory period set by the Examiner, and it is believed that no extension of time or fee therefor is required in connection herewith. If the Examiner determines that an extension of time is required in connection with the filing of this paper, petition is hereby made therefor, and the Commissioner is authorized to charge the fee to Deposit Account 50-0869 (Order No. CPAC 1013-1).

If the Examiner determines that a conference would facilitate prosecution of this application, the Examiner is invited to telephone Applicants' representative, undersigned, at the telephone number set out below.

Respectfully submitted,


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